US011013286B2

(12) **United States Patent**
Roundtree

(10) **Patent No.: US 11,013,286 B2**
(45) **Date of Patent: May 25, 2021**

(54) **IMPACT-ABSORBING HELMET**

(71) Applicant: **Vernard Roundtree**, Bloomington, IN (US)

(72) Inventor: **Vernard Roundtree**, Bloomington, IN (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 170 days.

(21) Appl. No.: **16/218,058**

(22) Filed: **Dec. 12, 2018**

(65) **Prior Publication Data**

US 2020/0187581 A1 Jun. 18, 2020

(51) **Int. Cl.**
A42B 3/06 (2006.01)
A42B 3/20 (2006.01)
A42B 3/12 (2006.01)

(52) **U.S. Cl.**
CPC ***A42B 3/064*** (2013.01); ***A42B 3/125*** (2013.01); ***A42B 3/20*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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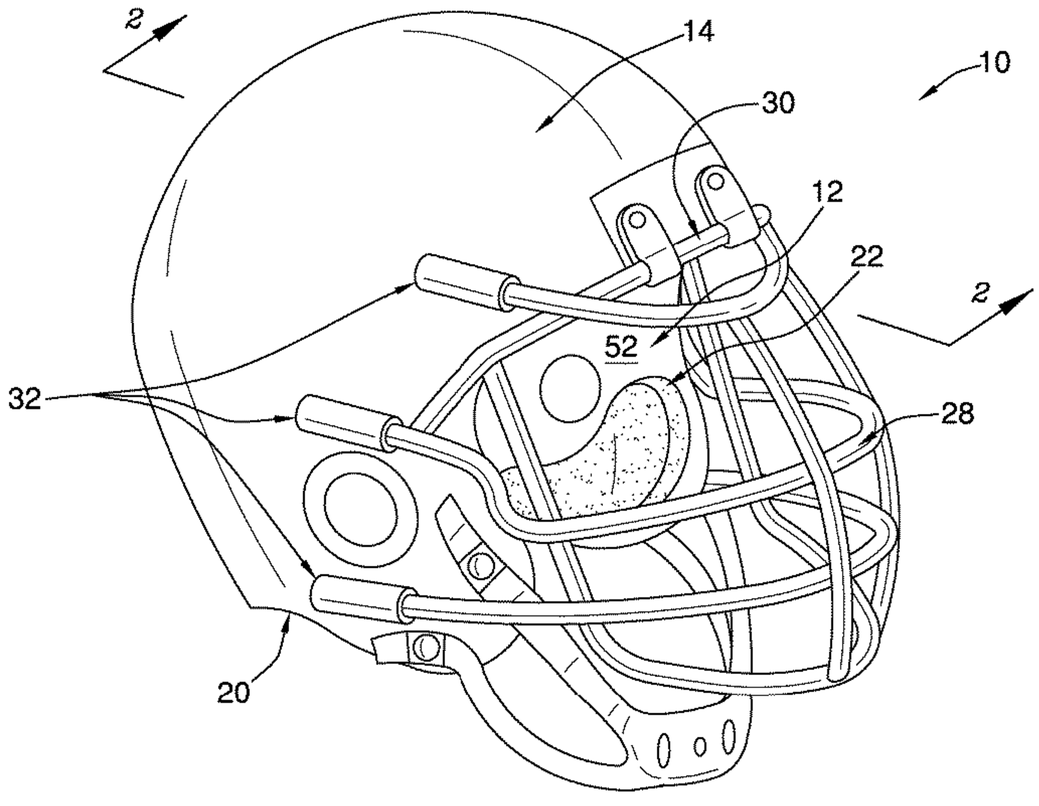
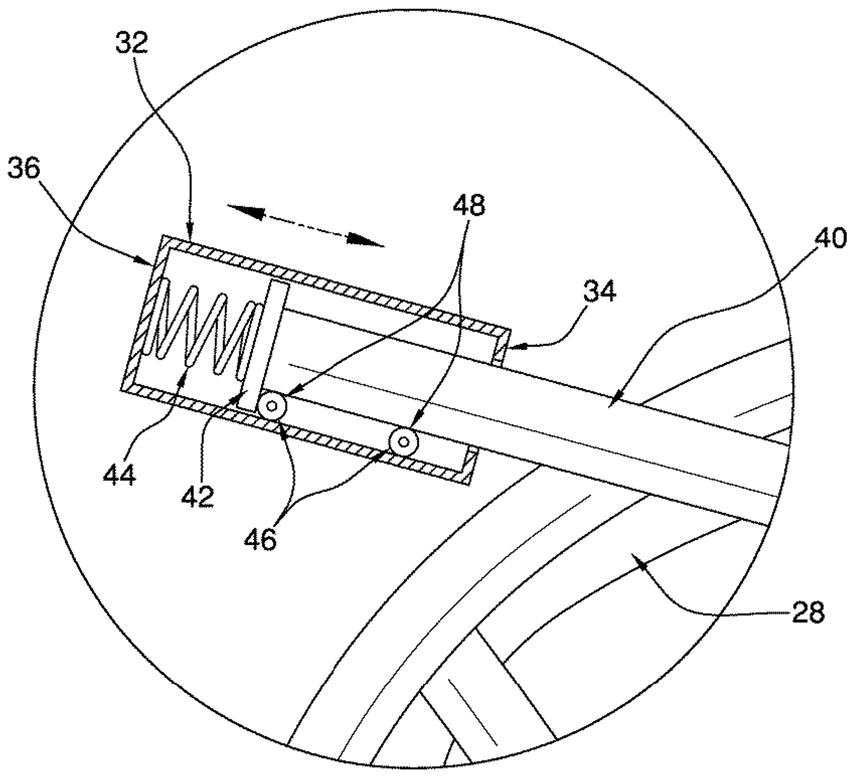
Primary Examiner — Jocelyn Bravo

(57) **ABSTRACT**

An impact-absorbing helmet for reducing brain trauma includes an inner shell and an outer shell. The inner shell has a bottom and a front that are open. The bottom is configured to insert a head of a user, positioning the front proximate to a face of the user. The outer shell is complementary to and positioned around the inner shell. The outer shell has an edge that is coupled to a rim of the inner shell so that the inner shell and the outer shell define an interior space. A plurality of first springs is positioned in the interior space. Each first spring is coupled to and extends between the inner shell and the outer shell. The first springs are configured to reduce transfer to the inner shell of a force applied to the outer shell.

13 Claims, 6 Drawing Sheets





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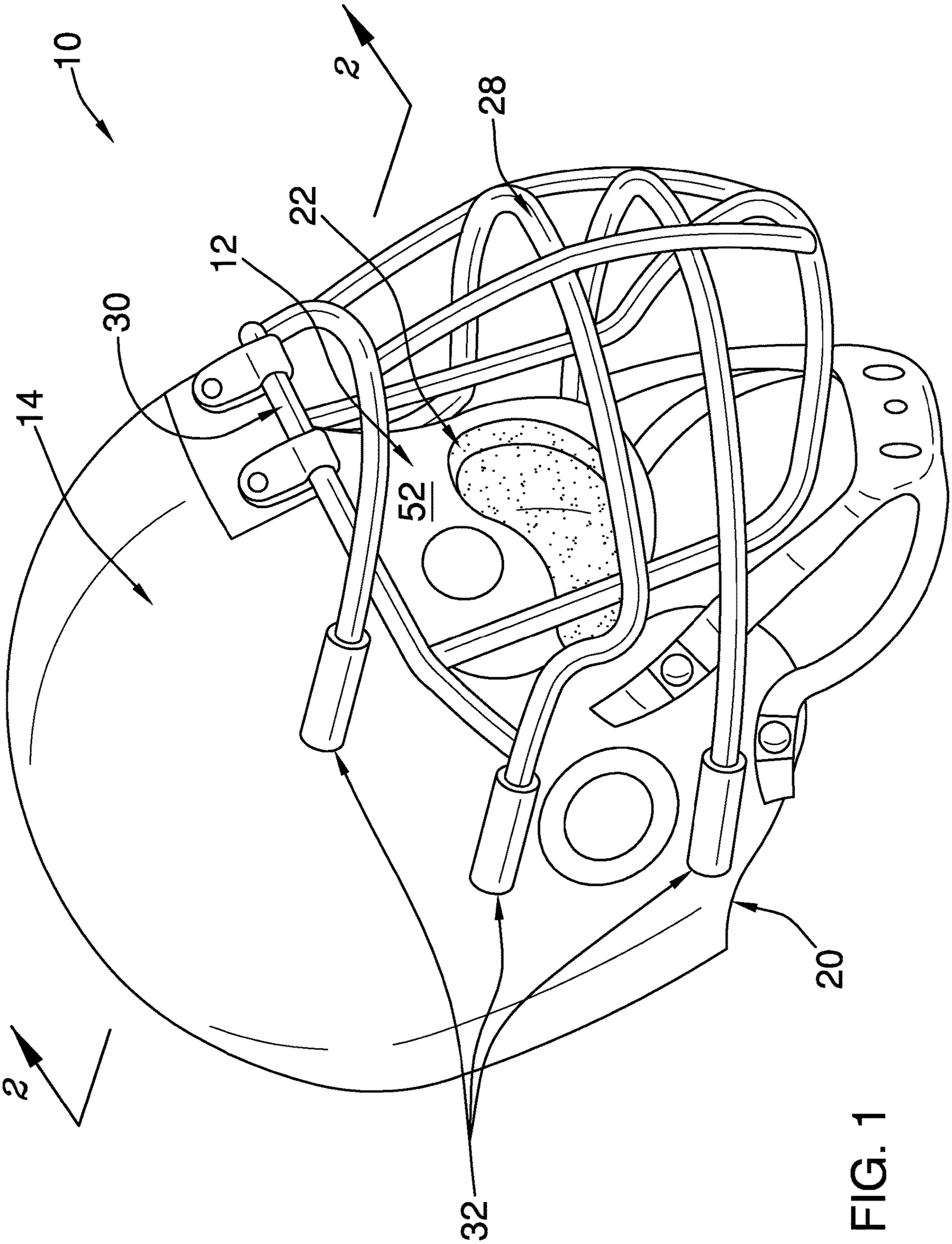

FIG. 1

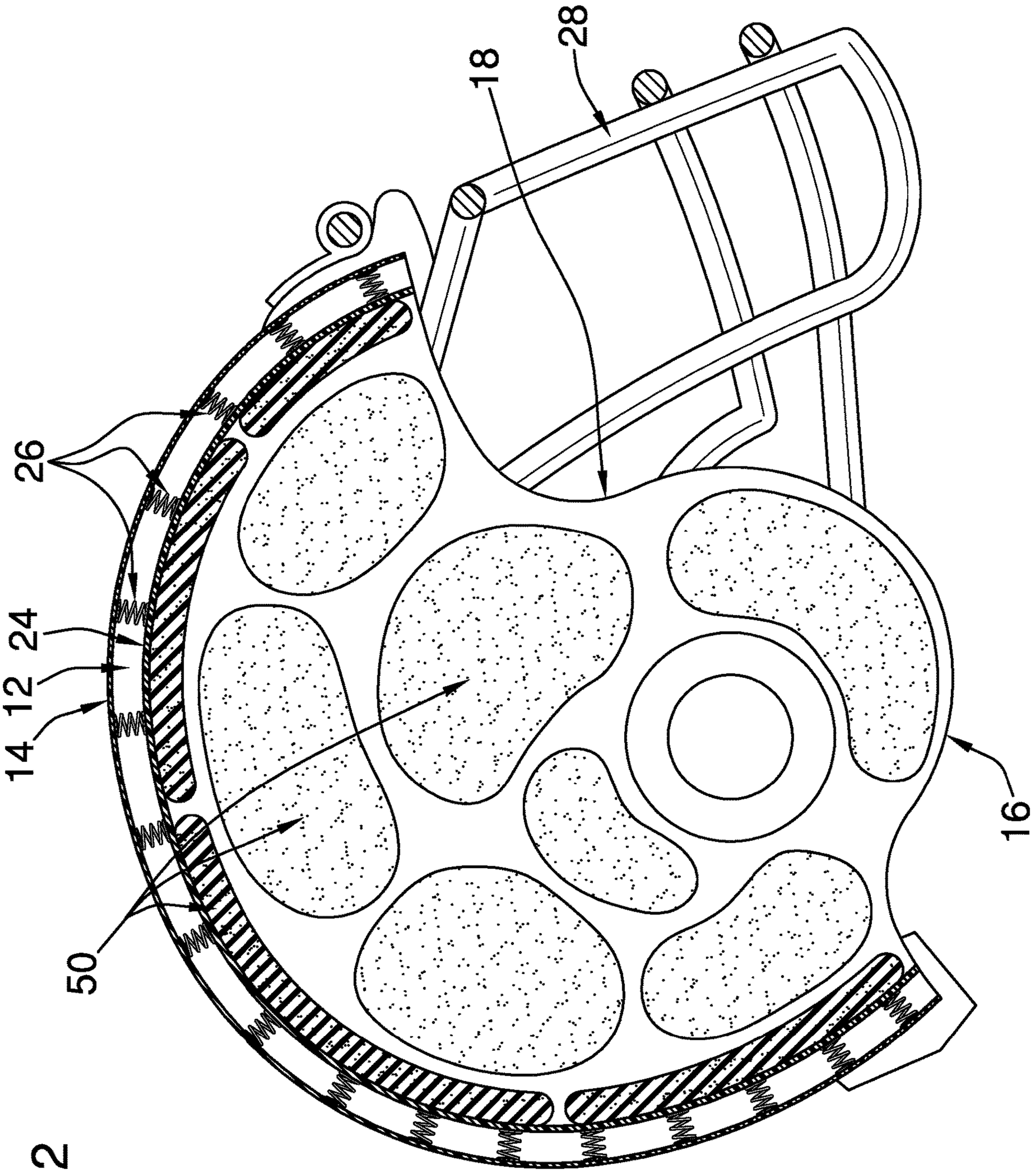

FIG. 2

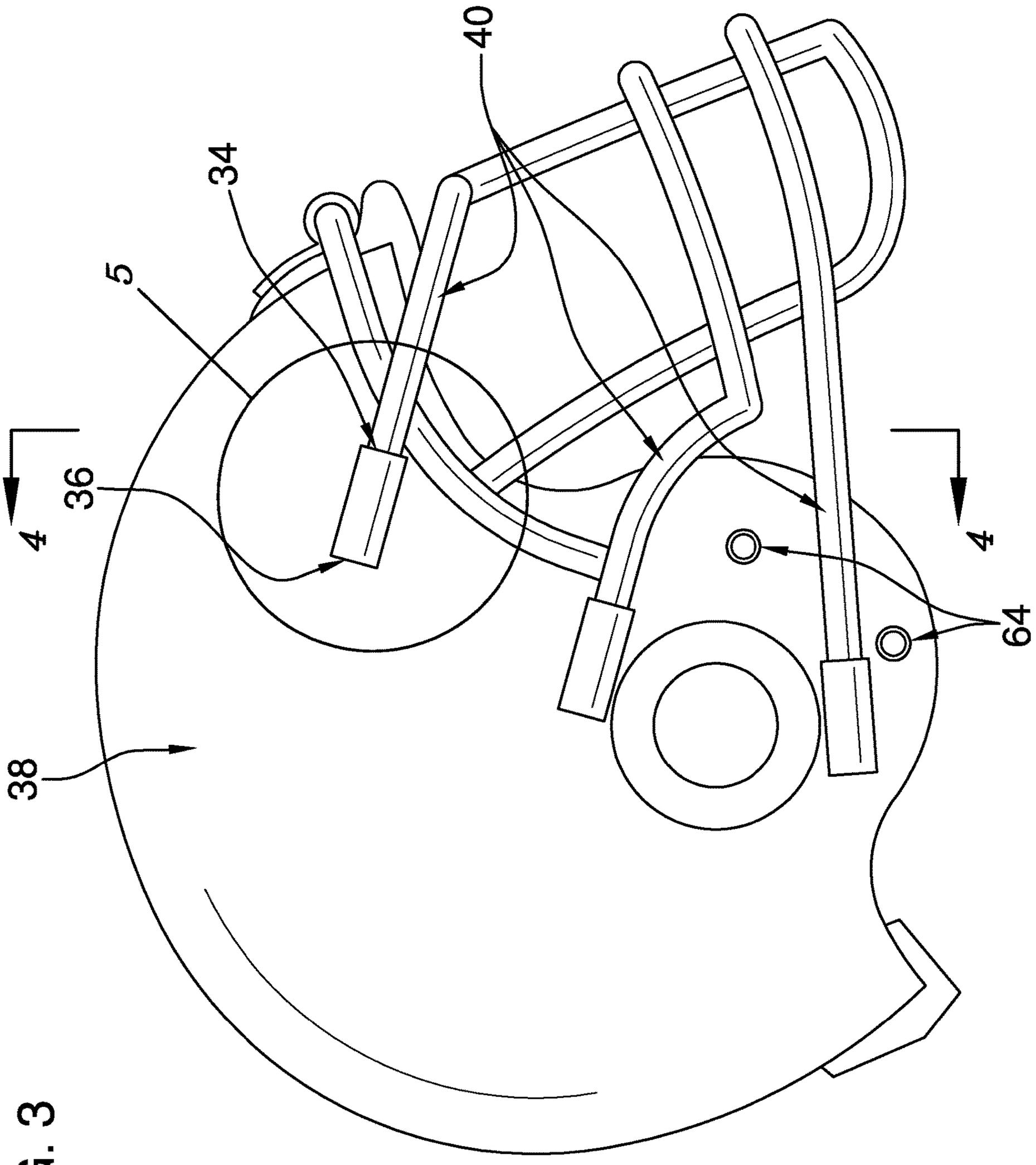

FIG. 3

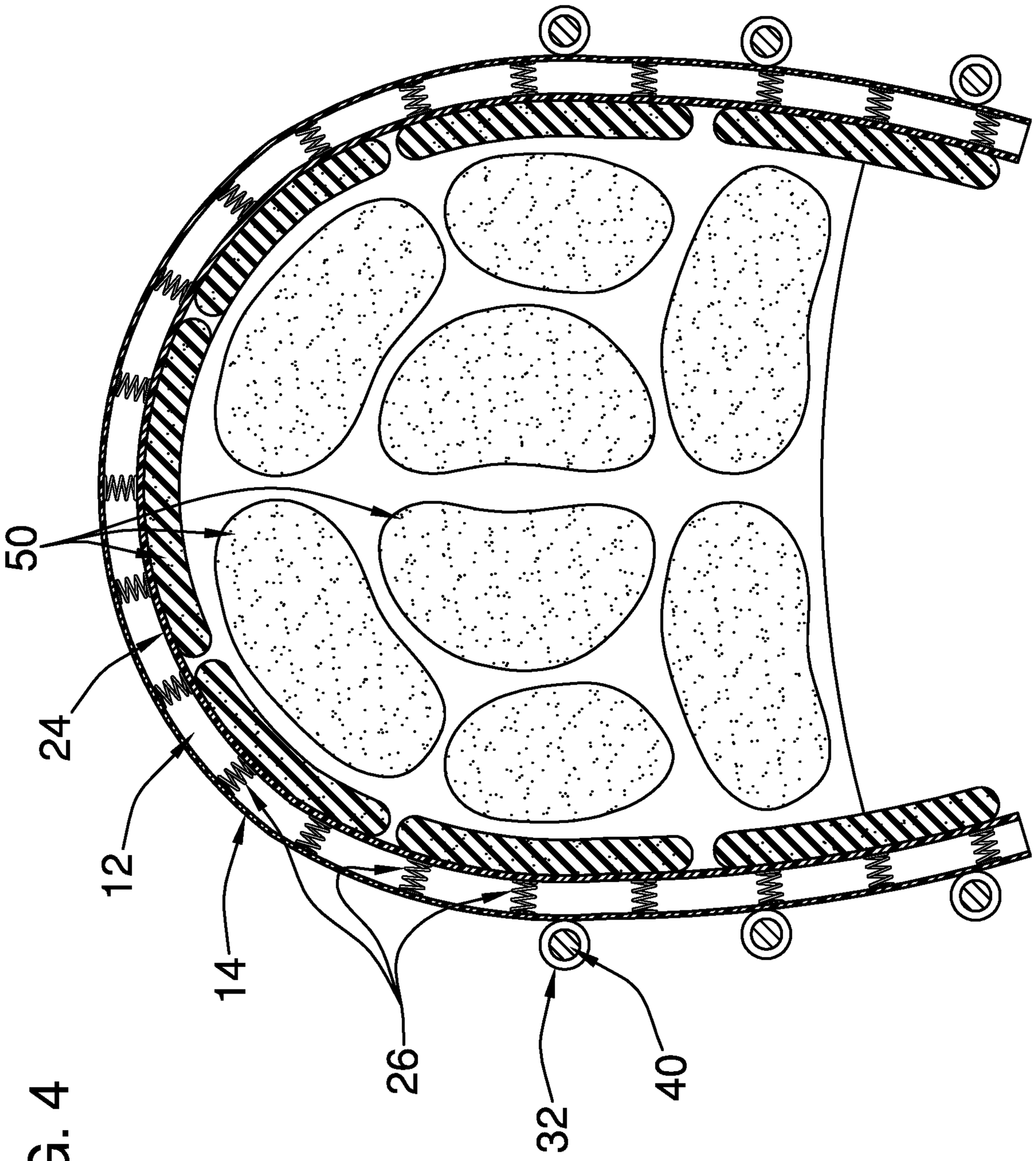

FIG. 4

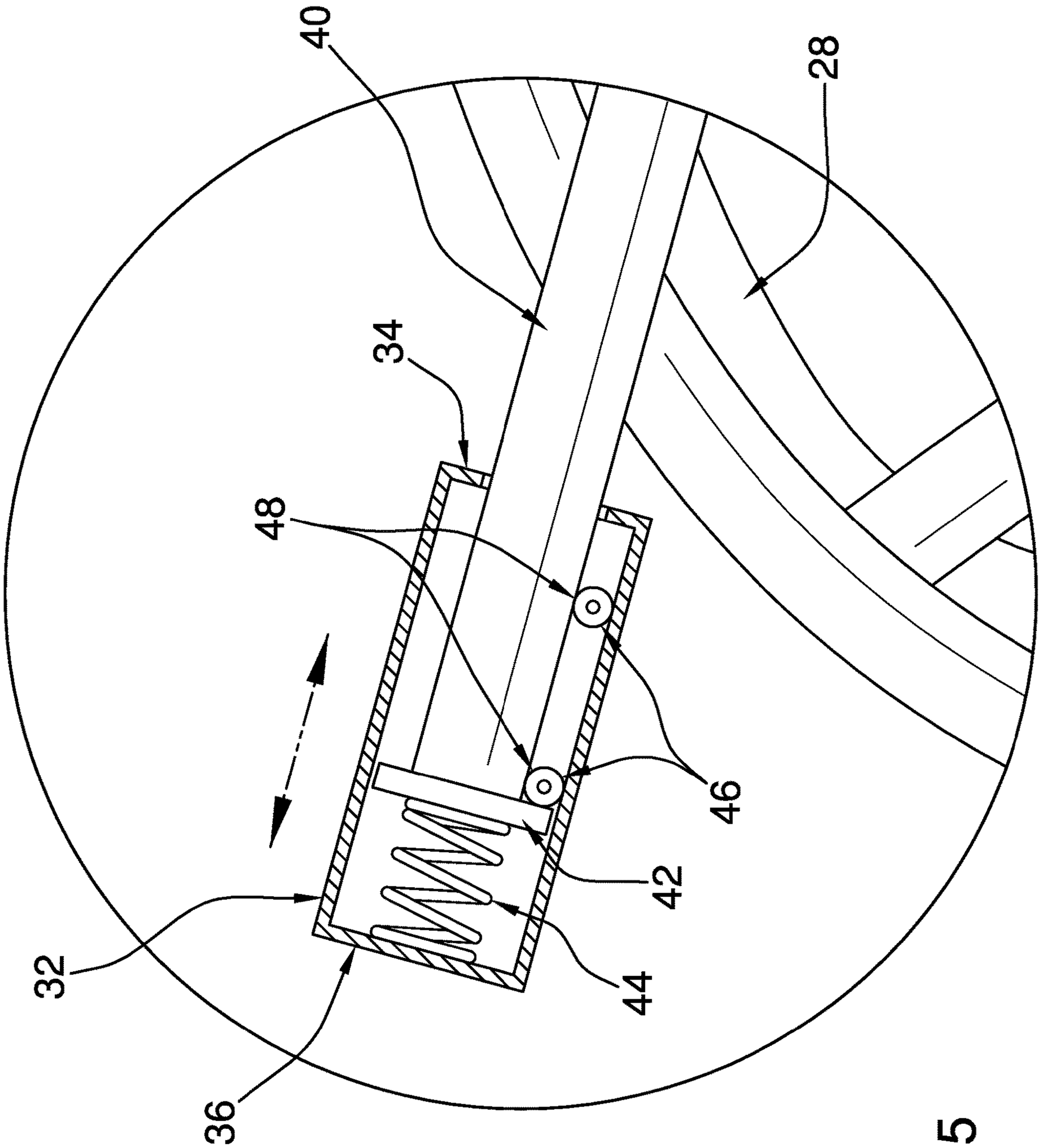

FIG. 5

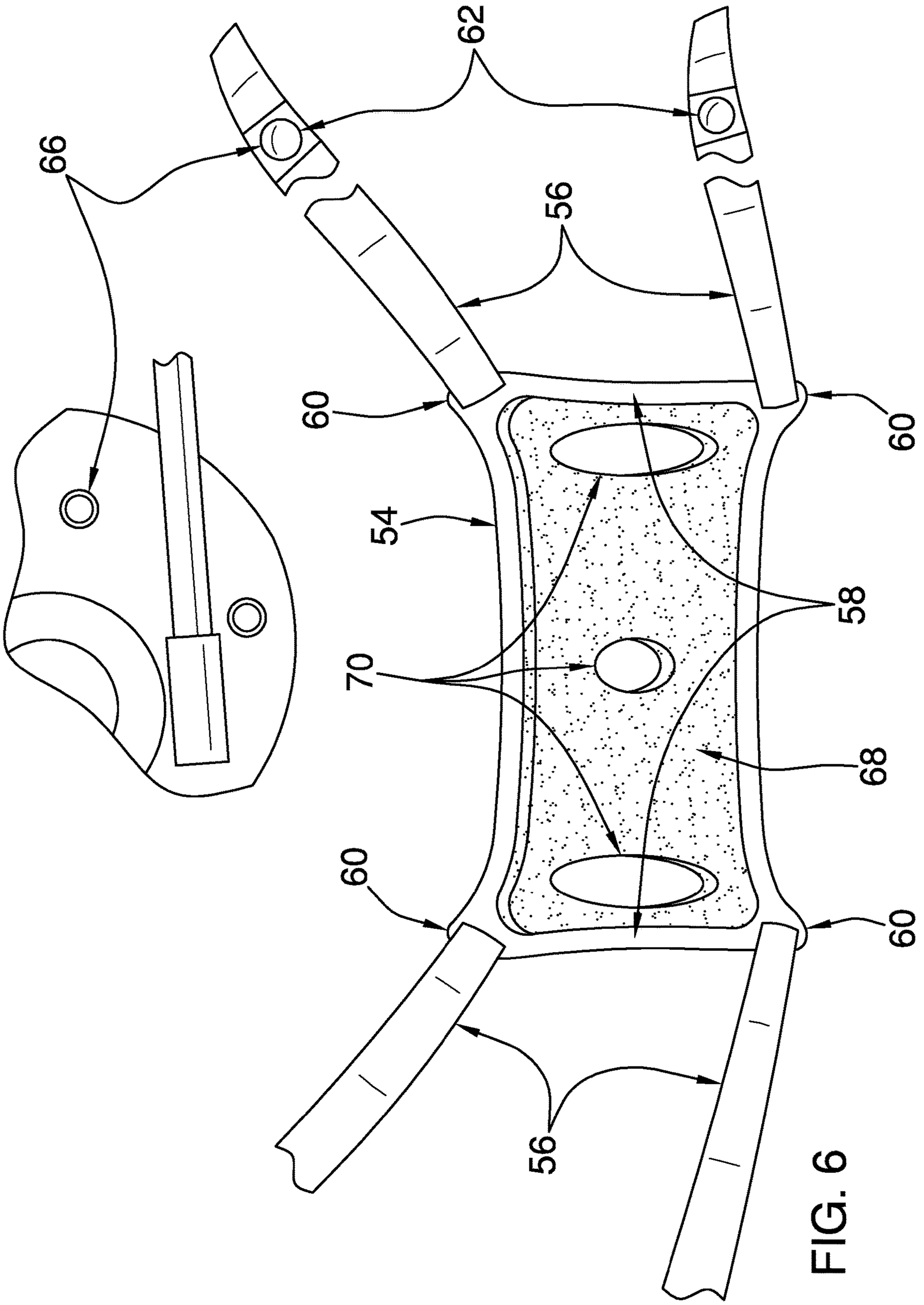

FIG. 6

IMPACT-ABSORBING HELMET

CROSS-REFERENCE TO RELATED APPLICATIONS

Not Applicable

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not Applicable

THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT

Not Applicable

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC OR AS A TEXT FILE VIA THE OFFICE ELECTRONIC FILING SYSTEM

Not Applicable

STATEMENT REGARDING PRIOR DISCLOSURES BY THE INVENTOR OR JOINT INVENTOR

Not Applicable

BACKGROUND OF THE INVENTION

(1) Field of the Invention

(2) Description of Related Art Including Information Disclosed Under 37 CFR 1.97 and 1.98

The disclosure and prior art relates to helmets and more particularly pertains to a new helmet for reducing brain trauma.

BRIEF SUMMARY OF THE INVENTION

An embodiment of the disclosure meets the needs presented above by generally comprising an inner shell and an outer shell. The inner shell has a bottom and a front that are open. The bottom is configured to insert a head of a user, positioning the front proximate to a face of the user. The outer shell is complementary to and positioned around the inner shell. The outer shell has an edge that is coupled to a rim of the inner shell so that the inner shell and the outer shell define an interior space. A plurality of first springs is positioned in the interior space. Each first spring is coupled to and extends between the inner shell and the outer shell. The first springs are configured to reduce transfer to the inner shell of a force applied to the outer shell.

There has thus been outlined, rather broadly, the more important features of the disclosure in order that the detailed description thereof that follows may be better understood, and in order that the present contribution to the art may be better appreciated. There are additional features of the disclosure that will be described hereinafter and which will form the subject matter of the claims appended hereto.

The objects of the disclosure, along with the various features of novelty which characterize the disclosure, are pointed out with particularity in the claims annexed to and forming a part of this disclosure.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWING(S)

The disclosure will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. **1** is an isometric perspective view of an impact-absorbing helmet according to an embodiment of the disclosure.

FIG. **2** is a cross-sectional view of an embodiment of the disclosure.

FIG. **3** is a side view of an embodiment of the disclosure.

FIG. **4** is a cross-sectional view of an embodiment of the disclosure.

FIG. **5** is a detail view of an embodiment of the disclosure.

FIG. **6** is an isometric perspective view of an embodiment of the disclosure.

DETAILED DESCRIPTION OF THE INVENTION

With reference now to the drawings, and in particular to FIGS. **1** through **6** thereof, a new helmet embodying the principles and concepts of an embodiment of the disclosure and generally designated by the reference numeral **10** will be described.

As best illustrated in FIGS. **1** through **6**, the impact-absorbing helmet **10** generally comprises an inner shell **12** and an outer shell **14**. The inner shell **12** has a bottom **16** and a front **18** that are open. The bottom **16** is configured to insert a head of a user, positioning the front **18** proximate to a face of the user.

The outer shell **14** is complementary to and positioned around the inner shell **12**. The outer shell **14** has an edge **20** that is coupled to a rim **22** of the inner shell **12** so that the inner shell **12** and the outer shell **14** define an interior space **24**. The outer shell **14** and the inner shell **12** comprise thermoplastic polymer so that the outer shell **14** and the inner shell **12** are resiliently deformable.

A plurality of first springs **26** is positioned in the interior space **24**, as shown in FIGS. **2** and **4**. Each first spring **26** is coupled to and extends between the inner shell **12** and the outer shell **14**. The first springs **26** are configured to reduce transfer to the inner shell **12** of a force that is applied to the outer shell **14**.

A grate **28** is pivotally coupled by an upper end **30** to the outer shell **14** so that the grate **28** is positioned to cover the front **18** of the inner shell **12**, as shown in FIG. **1**. The grate **28** is configured to protect the face of the user.

A plurality of cylinders **32** is coupled to the outer shell **14** so that a first end **34** of each cylinder **32** is positioned proximate to the front **18**. The first end **34** is open. Each cylinder **32** has a second end **36** that is closed. The plurality of cylinders **32** comprises six cylinders **32** that are positioned three-apiece on opposing sides **38** of the outer shell **14**, as shown in FIG. **4**.

A plurality of rods **40** is coupled to the grate **28**. Each rod **40** extends into an associated cylinder **32**. The rod **40** is circumferentially smaller than the associated cylinder **32**. Each of a plurality of plates **42** is coupled to a respective rod **40** distal from the grate **28**. The plate **42** is circumferentially complementary to the associated cylinder **32**.

Each of a plurality of second springs **44** is coupled to and extends between the second end **36** of a respective cylinder **32** and an associated plate **42**. The second spring **44** is positioned to be tensioned as the plate **42** is urged toward the second end **36** of the respective cylinder **32** by a force that is applied to the grate **28** to reduce transfer to the outer shell **14** of the force that is applied to the grate **28**. The second spring **44** is configured to rebound to urge the rod **40** distally from the second end **36** of the respective cylinder **32** when the force is removed from the grate **28**.

Each of a plurality of bearings **46** is coupled to and positioned in a respective cylinder **32**. The bearing **46** is positioned to facilitate movement of an associated rod **40** within the respective cylinder **32**. Each bearing **46** comprises a plurality of wheels **48**.

Each of a plurality of first pads **50** is coupled to an outer surface **52** of the inner shell **12**, as shown in FIGS. **2** and **4**, so that the plurality of first pads **50** abuts the head of the user. The first pads **50** are configured to reduce transfer to the head of the user of a force that is applied to inner shell **12**. The first pads **50** comprises silicone.

The helmet **10** also comprises a panel **54** that is substantially rectangularly shaped and which comprises leather. Each of a plurality of straps **56** is coupled to and extends from a respective opposing end **58** of the panel **54**. The plurality of straps **56** comprises four straps **56** that are coupled singly proximate to each corner **60** of the panel **54**.

Each of a plurality of first couplers **62** is coupled to a respective strap **56** distal from the panel **54**. Each of a plurality of second couplers **64** is coupled to the outer shell **14** proximate to the front **18** of the inner shell **12**. The second couplers **64** are complementary to the first couplers **62**. Each second coupler **64** is positioned to selectively couple to a respective first coupler **62** so that the panel **54** is positioned over a chin of the user. The plurality of straps **56** is configured to couple the outer shell **14** to the head of the user. The second coupler **64** and the respective first coupler **62** comprise a snap closure **66**.

A second pad **68** is coupled to the panel **54** so that the second pad **68** is positioned between the panel **54** and the chin of the user. The second pad **68** is positioned to cushion the panel **54**. The second pad **68** comprises silicone. Each of a plurality of apertures **70** extends through the panel **54** and the second pad **68**. The plurality of apertures **70** is configured to allow air exchange across the panel **54** and the second pad **68**.

In use, the user dons the helmet **10** and secures it to his or her head with the straps **56** using the snap closures **66**. The first springs **26**, the second springs **44**, and the first pads **50** are configured to reduce the force that is transferred to the head of impacts to the helmet **10**, which reduces trauma to the brain of the user.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of an embodiment enabled by the disclosure, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by an embodiment of the disclosure.

Therefore, the foregoing is considered as illustrative only of the principles of the disclosure. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the disclosure to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may

be resorted to, falling within the scope of the disclosure. In this patent document, the word "comprising" is used in its non-limiting sense to mean that items following the word are included, but items not specifically mentioned are not excluded. A reference to an element by the indefinite article "a" does not exclude the possibility that more than one of the element is present, unless the context clearly requires that there be only one of the elements.

I claim:

1. An impact-absorbing helmet comprising:

an inner shell, the inner shell having a bottom and a front, the bottom and the front being open; wherein the bottom is configured for receiving a head of a user and the front is configured to be positioned proximate to a face of the user;

an outer shell complementary to the inner shell and positioned around the inner shell, the outer shell having an edge coupled to a rim of the inner shell such that the inner shell and the outer shell define an interior space;

a plurality of first springs positioned in the interior space, each first spring being coupled to, and extending between, the inner shell and the outer shell, wherein the first springs are configured for reducing transfer to the inner shell of a force applied to the outer shell;

a grate pivotally coupled at an upper end of the grate to the outer shell such that the grate is positioned for covering the front of the inner shell, wherein the grate is configured for protecting the face of the user;

a plurality of cylinders coupled to the outer shell, each cylinder having an open first end and a closed second end, wherein the first end of each cylinder is positioned proximate to the front;

a plurality of rods coupled to the grate, each rod extending into a respective cylinder of the plurality of cylinders, each rod being circumferentially smaller than the respective cylinder;

a plurality of plates, each plate being coupled to a distal end of a respective rod of the plurality of rods, each plate being circumferentially complementary to the respective cylinder;

a plurality of second springs, each second spring being coupled to, and extending between, the closed second end of a respective cylinder of the plurality of cylinders and a respective plate of the plurality of plates, wherein each second spring is positioned for tensioning as the respective plate is urged toward the closed second end of the respective cylinder by a force applied to the grate, for reducing transfer to the outer shell of the force applied to the grate, and wherein each second spring is configured for rebounding for urging the respective plate away from the closed second end of the respective cylinder when the force is removed from the grate; and

a plurality of bearings, each bearing being coupled to and positioned in a respective cylinder of the plurality of cylinders, wherein each bearing is positioned for facilitating movement of the respective rod within the respective cylinder, each bearing comprising a plurality of wheels.

2. The helmet of claim **1**, further including wherein the outer shell and the inner shell comprise thermoplastic polymer such that the outer shell and the inner shell are resiliently deformable.

3. The helmet of claim **1**, wherein the plurality of cylinders comprise six cylinders positioned three-apiece on opposing sides of the outer shell.

4. The helmet of claim 1, further including a plurality of first pads coupled to an inner surface of the inner shell such that the plurality of first pads is configured to abut the head of the user, and wherein the first pads are configured for reducing transfer to the head of the user of a force applied to the inner shell.

5. The helmet of claim 4, wherein the first pads comprise silicone.

6. The helmet of claim 1, further comprising:

a panel;

a plurality of straps, each strap being coupled to and extending from a respective opposing end of the panel;

a plurality of first couplers, each first coupler being coupled to a distal portion of a respective strap of the plurality of straps;

a plurality of second couplers coupled to the outer shell proximate to the front of the inner shell, the second couplers being complementary to the first couplers, wherein each second coupler is positioned for selectively coupling to a respective first coupler of the plurality of first couplers, such that the panel is configured to be positioned over a chin of the user, and wherein the plurality of straps is configured for coupling the outer shell to the head of the user; and

a second pad coupled to the panel such that the second pad is configured to be positioned between the panel and the chin of the user wherein the second pad is positioned for cushioning the panel.

7. The helmet of claim 6, wherein the panel is substantially rectangularly shaped.

8. The helmet of claim 7, wherein the panel comprises leather.

9. The helmet of claim 7, wherein the panel comprises corners, the plurality of straps comprising four straps coupled singly proximate to each corner of the panel.

10. The helmet of claim 7, wherein each second coupler and each first coupler comprises a snap closure.

11. The helmet of claim 7, wherein the second pad comprises silicone.

12. The helmet of claim 7, further including a plurality of apertures, each aperture extending through the panel and the second pad, wherein the plurality of apertures is configured for air exchange across the panel and the second pad.

13. An impact-absorbing helmet comprising:

an inner shell, the inner shell having a bottom and a front, the bottom and the front being open; wherein the bottom is configured for receiving a head of a user and the front is configured to be positioned positioning the front proximate to a face of the user;

an outer shell complementary to the inner shell and positioned around the inner shell, the outer shell having an edge coupled to a rim of the inner shell such that the inner shell and the outer shell define an interior space, the outer shell and the inner shell comprising thermoplastic polymer such that the outer shell and the inner shell are resiliently deformable;

a plurality of first springs positioned in the interior space, each first spring being coupled to, and extending between, the inner shell and the outer shell, wherein the first springs are configured for reducing transfer to the inner shell of a force applied to the outer shell;

a grate pivotally coupled at an upper end of the grate to the outer shell such that the grate is positioned for covering the front of the inner shell, wherein the grate is configured for protecting the face of the user;

a plurality of cylinders coupled to the outer shell, each cylinder having an open first end and a closed second end, wherein the first end of each cylinder is positioned proximate to the front, the plurality of cylinders comprising six cylinders positioned three-apiece on opposing sides of the outer shell;

a plurality of rods coupled to the grate, each rod extending into a respective cylinder of the plurality of cylinders, each rod being circumferentially smaller than the respective cylinder;

a plurality of plates, each plate being coupled to a distal end of a respective rod of the plurality of rods, each plate being circumferentially complementary to the respective cylinder;

a plurality of second springs, each second spring being coupled to, and extending between, the closed second end of a respective cylinder of the plurality of cylinders and a respective plate of the plurality of plates, wherein each second spring is positioned for tensioning as the respective plate is urged toward the closed second end of the respective cylinder by a force applied to the grate, for reducing transfer to the outer shell of the force applied to the grate, and wherein each second spring is configured for rebounding for urging the respective plate away from the closed second end of the respective cylinder when the force is removed from the grate;

a plurality of bearings, each bearing being coupled to and positioned in a respective cylinder of the plurality of cylinders, wherein each bearing is positioned for facilitating movement of the respective rod within the respective cylinder, each bearing comprising a plurality of wheels;

a plurality of first pads coupled to an inner surface of the inner shell such that the plurality of first pads are configured to abut the head of the user, wherein the first pads are configured for reducing transfer to the head of the user of a force applied to the inner shell, the first pads comprising silicone;

a panel, the panel being substantially rectangularly shaped and having corners, the panel comprising leather;

a plurality of straps, each strap being coupled to and extending from a respective opposing end of the panel, the plurality of straps comprising four straps coupled singly proximate to each corner of the panel;

a plurality of first couplers, each first coupler being coupled to a distal portion of a respective strap of the plurality of straps;

a plurality of second couplers coupled to the outer shell proximate to the front of the inner shell, the second couplers being complementary to the first couplers, wherein each second coupler is positioned for selectively coupling to a respective first coupler of the plurality of first couplers, such that the panel is configured to be positioned over a chin of the user, and wherein the plurality of straps is configured for coupling the outer shell to the head of the user, each second coupler and each first coupler comprising a snap closure;

a second pad coupled to the panel such that the second pad is configured to be positioned between the panel and the chin of the user, wherein the second pad is positioned for cushioning the panel, the second pad comprising silicone; and

a plurality of apertures, each aperture extending through the panel and the second pad, wherein the plurality of apertures is configured for air exchange across the panel and the second pad.

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